CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 92 - 010

WASTE DISCHARGE REQUIREMENTS FOR:

CHEVRON U.S.A., INC.
RICHMOND REFINERY
CLASS II SOLID WASTE DISPOSAL SITE
LANDFILL 15
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. Chevron U.S.A., Inc.'s Richmond Refinery (hereinafter called the Discharger) manufactures and stores over 300 different refinery products including gasoline, jet fuel, fuel oils, diesel, lube oil, solvents catalysts and crude oil. Solid and liquid wastes generated over the years has been discharged at various waste management units around the refinery, including Pollard Pond/Landfill and Landfill 15.

2. The discharger's Richmond Refinery is located on the northeast shore of San Pablo Point in Richmond, California. Landfill 15, occupying a 41 acre area, is located in the northeastern corner of the Refinery. The landfill is bounded by Xylene Street to the west, Castro Creek at the north and eastern sides, Castro Creek tributary and a parking lot to the south.

3. Landfill 15 was formerly a marshland traversed by natural sloughs. Beginning in 1960, the area was developed and used for various waste disposal including waste water, oily sludge, oily dredging, oily soil, catalyst fines, paint sludge, sulfur, salt brine, road asphalt, rocks, concrete and spent activated charcoal.

4. The Discharger submitted a "Report of Waste Discharge(ROWD) / Solid Waste Assessment Test (SWAT)" report for Landfill 15 in response to the requirements of Waste Discharge Requirements No. Order 88 - 044. The discharger proposes to modify Landfill 15 by the installation of a barrier wall and extraction trench along downgradient of the landfill's perimeter.

5. The Discharger proposes to discharge non-hazardous, contaminated solid wastes generated by ongoing environmental cleanup activities within the Refinery. The wastes will include those from the Discharger's Pollard Pond/Landfill where an estimated 60,000 cubic yard of acidic sludge and dredged bay mud material will be excavated and treated before disposal to Landfill 15.

6. The average dry weather discharge of approximately 6 million gallons per day of waste water from the Refinery is regulated under NPDES Permit No. CA005134 Order No. 87 - 073.

7. A total of twelve borings were used to the evaluate the physical nature of waste materials and lithology as they exist in the landfill. Landfill 15 is situated in the San Pablo Bay margin area of the refinery. Site stratigraphy in descending order consists of the artificial fill, bay mud, older bay mud, alluvial / estuarine deposit and the Franciscan bed which underlies most of the refinery.

   a. The artificial fill consists of two layers.

      i. This is a layer of heterogenous mixture of silt, sand, gravel and clay. This upper layer generally called the upper fill, ranges from 3 feet to 8 feet in thickness. Field hydraulic conductivity of this layer is approximately 5.87 x 10^{-4} cm/sec. Most of the fill material consist of imported waste material.

      ii. An oily sludge material, mostly imported, underlies the upper fill and ranges from 0 to 8 feet in thickness. Field hydraulic conductivity of this layer is less than 5.87

x 10^{-4} cm/sec.

b. Bay Mud consist of two layers.

i The younger Bay Mud underlies the oily sludge and consist of dark gray soft silty clay which contain varying amounts of peat, plant debris and sand unit. This unit ranges from 3 feet to 24 feet in thickness.

ii Older Bay Mud underlies the younger Bay Mud and is generally more consolidated than younger Bay Mud. The older Bay Mud consist of bluish to greenish gray moderately stiff clay. Thickness of the unit ranges from 0 to 11.5 feet. Field hydraulic conductivity of the entire Bay Mud ranges from 1.47 x 10^{-6} to 8.14 x 10^{-6} cm/sec.

c. The alluvial/estuarine deposits underlies the Bay Mud. Sediments in the layer are interfingered and laterally variable. Generally stiffer and more consolidated than the older Bay Mud. The alluvial sediments consists of silty clays and sandy silts while the estuarine deposits are commonly finer grained consisting of silty clays with local sand lenses and traces of gravel. Field hydraulic conductivity of the alluvium material is about 1.35 x 10^{-3} cm/sec to 3.24 x 10^{-3} cm/sec.

8. Surface water bodies existing within one mile radius of the Richmond Refinery include San Francisco and San Pablo Bay, Harbor and Santa Fe Channel, Lauritzen Canal, Wildcat Creek, San Pablo Creek, Castro Creek, and marsh areas north of Chevron Refinery. Surface water bodies within one mile of Landfill 15 are Castro Creek and Castro Cove.

9. Castro Creek receives water from rainfall, runoff, slight tidal fluctuations and other sources from northern Richmond. Water samples from Castro Creek show low concentration of metals including arsenic, iron, lead, manganese and zinc. Purgeable organics detected include dichloroethane, chloroform, methylene, perchloroethylene (PCE), trichloroethylene (TCE). Toluene and xylene were also detected. The sources of these contaminants are unknown to the discharger.

10. The elevation of Landfill 15 ranges from 7.5 feet Richmond Refinery Datum (RRD) in the eastern half of the main landfill to 18.5 feet (RRD) in the north western corner of the site. Rainfall at the site infiltrates into the soil, forms puddles, evaporates or flows off site. Surface runoff from perimeter areas of the landfill drains to Castro Creek. In an 100 year storm, Castro Creek may overflow and flood limited portions of Landfill 15 and carry storm sediments from the landfill to the creek. Currently, surface runoff from the central portion of the landfill flows through a culvert into the refinery effluent system.

11. Within 100 feet beneath Landfill 15, two main groundwater zones (A and C) appear to be continuous over the entire site.

a. Zone A is a shallow aquifer with water tables in the range of 0.5 feet to 3 feet below ground surface. Refinery groundwater from Zone A flows north west towards the San Pablo Bay. In the immediate vicinity of Landfill 15, groundwater direction is southeast and north toward Castro Creek and its tributary. Soils within Zone A consist of the artificial fill underlain by the Bay Mud. The field hydraulic conductivity in Zone A ranges from 1.4 x 10^{-6} cm/sec to 5.87 x 10^{-4} cm/sec.

b. Zone C groundwater occurs in confined / semi-confined condition at about 20 feet to 100 feet below ground surface in the vicinity of Landfill 15. The older Bay mud separates Zones A and C; however it is not clear whether hydraulic connection between Zones A and C exist. Zone C consist of silts, clays and interfingering sand lenses. Zone C groundwater flow direction refinery wide is generally towards the San Pablo Bay. In the vicinity of Landfill 15 there exists a groundwater divide such that flow direction in the northern

portion of Landfill 15 is toward Castro Cove and while flow in the southern portion is toward the Lauritzen Canal, Santa Fe Channel and San Francisco Bay. Field hydraulic conductivity in Zone C ranges from 5×10^{-5} cm/sec to 1.09×10^{-3} cm/sec. Laboratory permeability test range from 4.94×10^{-8} cm/sec to 3.64×10^{-7} cm/sec.

12. Samples of groundwater from zones A and C beneath Landfill 15 were evaluated to determine the quality of groundwater in these zones.

    a. Results of analysis of sample from the Zone A show that pH ranged from 6.4 to 7.2 units. Metals detected include arsenic, lead, nickel, barium, and selenium, however all metal concentrations were below their respective Soluble Threshold Limit Concentration (STLC) levels. Benzene and toluene were detected at 98 ug/L and 28 ug/L concentrations respectively. One-methylnaphtalene, chrysene, benzo(a)anthracene and phenanthrene were also detected. Oily liquid, denser than water, was discovered in well GW-235A. Total Dissolved Solids (TDS) ranged from 10 mg/L to 50,700 mg/L and Total Recoverable Petroleum Hydrocarbons (TRPH), EPA 418.1 method) ranged from 0.73 mg/L to 2.4 mg/L.

    b. Groundwater samples from the Zone C show a pH in the range of 2.9 to 6.2. Metals detected includes arsenic, barium, lead and nickel. TDS ranged from 40 mg/L to 52,000 mg/L.

13. Analysis of the chemical content of the fill, sludge and Bay Mud material were determined using samples from twelve geochemical borings:

    a. In the upper fill concentrations of metals were below their respective Total Threshold Limit Concentration (TTLC) levels, however lead and nickel concentrations exceeded 10 times the STLC levels. Waste Extraction Test (WET) conducted on five samples show one lead concentration of 8 mg/L which exceeds lead STLC level of 5 mg/L. The pH level in the upper fill ranged from 4.4 - 9.8. The TRPH concentrations ranged from nondetect to 150,000 mg/kg. Five soil samples were tested for volatile organic compounds (VOC), only toluene at 1.2 mg/kg and xylene at 2.6 mg/kg were detected.

    b. In the sludge, concentration of metal were below their respective TTLC levels, however the total metal concentrations in ten samples exceeded 10 times the STLC levels. WET test on these samples show that concentrations of lead at 8 mg/L, arsenic at 10 mg/L and nickel at 35 mg/L, exceeded the STLC levels. TRPH ranged from 290 mg/kg to 280,000 mg/kg. The pH ranged from 6.8 - 11.7. VOCs detected includes benzene from 6.5 mg/kg to 35 mg/kg, ethylbenzene from 7.4 mg/kg to 30 mg/kg, toluene from 1.1 mg/kg to 11 mg/kg and xylene from 13 mg/kg to 110 mg/kg. Semivolatiles detected includes methynaphtalene and naphthalene.

    c. In the Bay Mud concentrations of metals were below their respective TTLC and STLC levels. The pH ranged from 6.0 to 9.5. TRPH ranged from 34 mg/kg to 6,400 mg/kg. VOCs detected include ethylbenzene at 0.88 mg/kg and xylene at 4.1 mg/kg.

14. In response to evidence of oil seepage to the ground surface in Landfill 15, the Discharger installed a continuous trench of approximately 1,700 feet near the western and northern boundaries and a total of 1,650 feet of linear trench in several other parts of the landfill. Free phase hydrocarbons are pumped and skimmed as necessary from the trenches.

15. The soils and groundwater immediately adjacent to and underlying the proposed waste management unit, have been contaminated from earlier operations at the landfill. The proposed site remediation effort, of which the slurry wall and extraction system are major components, focuses on isolation of the contaminated soils, containment and extraction of contaminated groundwater and discharge into appropriate disposal systems.

16. Landfill 15 contains designated waste and according to the discharger's proposal shall be receiving

approximately 80,000 cubic yards of treated pollard pond. Landfill 15 is classified as a Class II waste management unit and is subject to the requirements of Chapter 15, Article 3, Title 23 of the California Code of Regulations (CCR). Section 2510(b) of Chapter 15 allows for consideration of alternatives to the standards, only when the discharger has demonstrated that the standards are impracticable and, unreasonably and unnecessarily burdensome. In addition, the alternative design shall be specific engineered alternative consistent with the goals of the standard and affords equivalent protection against water quality impairment.

17. The proposed alternative design for the Landfill 15 does not meet the prescriptive design standards of a Class II waste management unit because it does not include engineered liners and, leachate collection and removal system (LCRS) and existing conditions are such that there is less than 5 feet separation between the bottom of the proposed unit and the highest anticipated level of the shallow(zone A) groundwater.

18. Strict compliance with the Class II standards is impractical as follows:

    a. Installation of an LCRS and engineered liner would interfere with the groundwater extraction system currently in place, as well as inhibit the development of planned groundwater monitoring and expanded groundwater extraction program within the Landfill.

    b. The cost ($207,000,000) of achieving Class II standard design is unnecessarily and economically burdensome.

19. The proposed engineered alternative design (Perimeter Slurry Walls and Extraction system on all sides except the Xylene street boundary), is consistent with the performance goal of the separation standards and affords equivalent water quality protection as follows:

    a. The shallow groundwater (Zone A), which has less than five feet separation from the ground surface has been generally contaminated throughout Richmond Refinery facility. Extraction and treatment of zone A groundwater provides equivalent protection of downgradient Zone A groundwater outside the Landfill.

    b. Deeper groundwater (Zone C) is separated from the ground surface by a distance ranging from 11 feet to 24 feet of consolidated natural geologic material (Bay Mud).

    c. The slurry walls and extraction system will ensure down gradient containment of contaminated groundwater and prevent lateral and offsite migration as required in Section 2532(b) of Chapter 15.

20. Section 2550.2, Article 5 of Chapter 15 describes the criteria for establishing a water quality protection standards. Constituents for which background concentration is to be established include metals listed in Section 66699, Article 11, Title 22 of the CCR and volatile organics including benzene, xylene and toluene.

21. Unless otherwise noted references to Chapter 15 are either to Article 3 or to Article 5, Title 23 of the California Code of Regulations.

22. Earthquakes posing a threat to the landfill could occur along the Hayward, San Andreas and Calaveras faults. The maximum ground surface acceleration - calculated for soft to medium clay and silt sites - is expected to be 0.35g for an event originating from a Richter Magnitude 6.4 Maximum Probable Earthquake (MPE) at the Hayward Fault about 3.7 km east of the site, 0.35g for an event originating from Richter Magnitude 7.75 MPE at the San Andreas fault located about 24 km west and 0.35g for an event originating from Richter Magnitude 6.6 MPE at the Calaveras fault.

23. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region Basin

plan on December 17, 1986; and amended it on August 19, 1987 and on July 18, 1989. The Basin Plan contains water quality objectives and beneficial uses for San Francisco Bay and contiguous surface and ground water bodies. This Order implements the water quality objectives for San Pablo Bay which are consistent with the Basin Plan.

24. The beneficial uses of the surface waters in the vicinity of the site, which include Wildcat Creek, Castro Creek and San Pablo Bay, are:

a. Industrial Service Supply
b. Navigation
c. Water Contact Recreation
d. Non-contact Water recreation
e. Ocean Commercial and Sport Fishing
f. Wildlife Habitat
g. Preservation of Rare and Endangered Species
h. Fish Migration
i. Fish Spawning
j. Shellfish Harvesting
k. Estuarine Habitat
l. Warm Fresh Water Habitat

25. The existing and potential beneficial uses of groundwaters near the Discharger's property include:

a. Limited Domestic Supply
b. Limited Agricultural Supply
c. Industrial Supply

26. This action is exempt from the provisions of the California Environmental Quality Act pursuant to Section 15308, Title 14 of the California Code of Regulations.

27. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

28. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Chevron USA Inc., Richmond Refinery and any other persons that currently or in the future own this land or operate this facility, shall meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and shall also comply with the following:

A. PROHIBITIONS

1. The discharge of hazardous waste at this facility is prohibited. For the purposes of this Order, the term hazardous waste is as defined in Title 23, Article 2 of Chapter 15.

2. The discharge of material of containing free liquid or solid containing greater than 50% moisture to the landfill unit is prohibited.

3. The discharge of wastes which have the potential to reduce or impair the integrity of the containment structures or which, if commingled with other wastes in the unit, could produce chemical reactions that create heat or pressure, fire or explosion, toxic by-products, or reaction products which in turn:

o Require a higher level of containment than that provided by the unit;

- o Are "restricted hazardous wastes", or;

- o Impair the integrity of the containment structures, is prohibited.

4. Wastes shall not be disposed of in any way where they can be carried from the disposal site and discharged into waters of the State or of the United States.

5. The Discharger, or any future owner or operator of this Landfill, shall not permit or cause the following conditions to exist in waters of the State of California as a result of waste disposal operation at Landfill 15.

   a. Surface Waters

      - o Untreated storm water runoff from Landfill 15 to any surface system;

      - o Floating, suspended, or deposited macroscopic particulate matter or foam;

      - o Bottom deposits or aquatic growth;

      - o Adversely alter turbidity, apparent color, or water levels beyond natural background levels;

      - o Visible, floating, suspended or deposited oil or other products of petroleum origin; or,

      - o Toxic or other deleterious substances in concentrations or quantities which may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

   b. Groundwater

      - o Groundwater quality shall not be further degraded directly or indirectly as a result of the waste disposal operation.

6. Leachate generated from the wastes and any ponded water containing leachate, in contact with the wastes or within the landfill shall not be discharged to waters of the State or the United States, except as permitted through an appropriate NPDES permit.

7. Surface water collected from within the limits of the waste disposal area shall not be discharged to waters of the State except as permitted by an appropriate NPDES Permit.

8. Any future uses of the Landfill 15 area that would endanger the integrity of the slurry wall, trenches or other landfill containment structures is prohibited.

B. SPECIFICATIONS

1. During waste disposal, handling, or treatment, no wastes shall be placed in a position where they can be carried into the waters of the State. In addition, no waste shall be disposed at Landfill 15 prior to the completion of its reconstruction to a Class II waste management unit, except as permitted by the Executive Officer.

2. Clean water shall be used during disposal operations and shall be limited to a minimal amount necessary for dust suppression, waste compaction, and fire control.

3. Prior to any material being discharged to Landfill 15 it shall meet the following requirement.

   a. Pollard Pond / Landfill materials to be discharged to Landfill 15 shall meet at minimum the specifications outlined in Section B (final product specification) and Section C (landfill 15 compaction criteria) of Pollard Landfill Project, Pollard Material Acceptance Criteria. The discharger shall prepare a quality assurance / quality control plan to assure compliance with the above specifications.

   b. A program shall be implemented to ensure that hazardous materials are not discharged at the landfill and that the wastes discharged thereto shall be in accordance with Section 2522 of Chapter 15. For this purpose, the Discharger shall include in the program, a proposal acceptable to the Executive Officer, setting the maximum concentration levels for the constituents. The discharger shall consider the constituents listed in Table 3-2 of the ROWD (attachment 4). The pH and sulphate levels shall be included in the proposed concentration level. All proposed concentration levels shall at a minimum not exceed hazardous levels established in Title 22 of the CCR and shall be such that the entire waste can be classified as "Designated Waste" as defined in Title 23 of the CCR.

4. No waste shall be directly or indirectly discharged to Landfill 15 except wastes from the Pollard landfill or wastes allowed through the written permission of the Executive Officer. Only designated wastes satisfying the conditions in the Specifications of this Order may be discharged at Landfill 15 provided all regulations and provisions of the California Integrated Waste Management Board, California Department of Toxic Substances Control, local health agencies, and County Land Use Permit requirements are complied with.

5. Surface drainage from tributary areas, and external drainage from surface and subsurface sources, shall be minimized during disposal operations and during the life of the landfill. The discharger shall ensure that runoff is diverted away from the disposal area, such that it does not contact waste or leachate.

6. The landfill shall have a perimeter slurry wall, groundwater extraction system, perimeter raised embankment, surface drainage system designed and operated to collect and remove any runoff that might carry contaminants off site. These structures shall be designed in a manner acceptable to the Executive Officer, so as to prevent the migration or build-up of contaminated groundwater in the landfill. The system shall be inspected at least monthly, and the discharger shall provide a schedule for the operation of the Groundwater Protection System (GPS). Measures shall be taken to assure that the GPS will remain operational throughout the closure/post-closure maintenance period of the landfill.

7. The Discharger shall ensure that Landfill 15, and the structures which control groundwater and surface water for this site, are constructed and maintained to withstand load or enable repair from conditions generated during a maximum probable earthquake event at the San Andreas, Calaveras and Hayward Fault Zones.

8. The discharger shall provide a written evidence of a fund for closure of the landfill and an interim closure plan for the landfill.

9. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area of the waste management unit and comply with Section 2550.7 (a) and (b) of Article 5, Chapter 15.

10. An monitoring program, as required in Sections 2550.1, 2550.7(b), and 2550.9 of Chapter 15 shall be implemented where water quality impairment has occurred, or upon determination that a statistically significant increase in indicator parameters or waste constituents has occurred during detection monitoring.

11. The Discharger shall operate Landfill 15 so as not to cause a statistically significant difference to exist between water quality at the compliance points and the water Quality Protection Standards (WQPS) to be established. The Discharger shall establish WQPS according to the requirements of this Order and Article 5 of Chapter 15 for, at a minimum, the parameters established for the Discharger's Groundwater Monitoring Program. In addition, because of the petroleum contaminated soils to be contained within the unit, the Discharger shall establish WQPS for the following minimum parameters:

    Total Petroleum Hydrocarbons as gasoline (Use EPA Method 8015 Modified);
    Total Petroleum Hydrocarbons as diesel (Use EPA Method 8015 Modified).

12. The concentrations of the indicator parameters or waste constituent in waters passing through Points of Compliance shall not exceed the WQPS established by the Provisions of this Order.

13. The Discharger shall install any additional groundwater, surface runoff and leachate monitoring devices required to fulfill the terms of this Order.

14. If surface water or groundwater contamination or potential contamination is detected, the Discharger shall give immediate notification to the San Francisco Bay Regional Water Quality Control Board, the Local Enforcement Agency, and the Department of Toxic Substances Control - Cal EPA. The Discharger shall initiate its corrective action plan to stop and contain the migration of pollutants from the landfill.

15. The landfill shall be designed and constructed in a manner acceptable to Executive Officer. The final as-built construction report shall include, but not be limited to, "as built" drawings for the waste management unit, final location of waste discharged within the landfill, a Quality Assurance / Quality Control (QA/QC) report with a written summary of the QA/QC program and all test results and analyses, and a certification as described in the Provisions.

16. The Discharger shall maintain all devices or structures, installed in accordance with this Order such that they continue to operate as intended without interruption except as a result of failures which could not have been reasonably foreseen or prevented by the Discharger.

17. This Board considers the property owner and site operator to have continuing responsibility for correcting any problems which arise in the future as a result of this waste discharge or related operations.

C. PROVISIONS

1. The Discharger shall comply with all Prohibitions, Specifications, and Provisions of this Order immediately upon adoption of this Order.

2. All submittal of hydrogeological plans, specifications, reports, and documents (except progress and self-monitoring reports), shall be signed by and stamped with the seal of a California registered geologist, registered engineering geologist, or registered professional engineer as specified by Chapter 15.

3. The Discharger shall submit a detailed Post Earthquake Inspection and Corrective Action Plan acceptable to the Executive Officer to be implemented in the event of any earthquake generating ground shaking of Modified Mercalli Intensity V or greater at or near the landfill. The report shall describe the containment features, and groundwater monitoring and pumping facilities potentially impacted by the static and seismic deformations of the

landfill. The plan shall provide for reporting the results of the post-earthquake inspection to the Board within 18 hours of the occurrence of the earthquake. Immediately after an earthquake event causing damage to the landfill structures, the corrective action plan shall be implemented and this Board shall be notified of any damage.

REPORT DUE DATE: No Later Than June 30, 1992

4. The Discharger shall submit a detailed work plan acceptable to the Executive Officer, for the construction of landfill 15 containment and monitoring facilities acceptable to the Executive Officer. The plan shall include time schedule, detailed construction design for structures and devices to be installed.

In addition, the plan shall include a storm water runoff management plan for the landfill. The storm water runoff management plan shall address proposals which include but are not limited to, elimination of offsite runoff, an estimate of the quantity of runoff, storage system and ultimate disposal of the storm water.

REPORT DUE DATE: No Later Than April 31, 1992.

5. The Discharger shall submit an interim As-Built Landfill Design Report acceptable to the Executive Officer. The report should address the construction of the various components of the landfill, including detailed specifications for construction of barrier, trenches, extraction wells and embankments, including the Quality Assurance and Quality Control Procedures (QA/QC), for all aspects of construction and installation. In addition, all groundwater treatment methods before final disposal shall be included. The containment structure shall have been designed and constructed under the supervision of a California registered civil engineer or a certified engineering geologist. The report shall be signed and stamped with the seal of that individual.

INTERIM REPORT DUE DATE: No Later Than March 31, 1993

The discharger shall submit a final report documenting all necessary activities relating to the closure of Landfill as approved by the Executive Officer.

FINAL REPORT DUE DATE: No Later Than December 31, 1994.

6. The Discharger shall submit to the Board, a preliminary closure and post-closure maintenance plan acceptable to the Executive Officer pursuant to Title 23, CCR, Chapter 15, Article 9, Section 2597. The plan shall include but not be limited to, a certification of an irrevocable closure fund set aside for the closure of Landfill 15.

REPORT DUE DATE: No Later Than June 30, 1992

7. The discharger shall submit a closure plan for the Landfill acceptable to the Executive Officer including but not limited to design details for the cover, grading, erosion and drainage control of the Landfill.

REPORT DUE DATE: No Later Than June 30, 1992

8. Pursuant to Article 5, of Chapter 15, the Discharger shall propose or submit an updated groundwater, runoff and surface water monitoring program acceptable to the Executive Officer to detect any lateral or vertical migration of contaminants which could further contaminate groundwater at the site or surface water in the vicinity.

REPORT DUE DATE: No Later Than June 30, 1992.

9. Pursuant to Article 5, of Chapter 15, the Discharger shall submit a report acceptable to the Executive Officer proposing a plan for establishing a Water Quality Protection Standard for constituents and parameters outlined in the specifications and findings of this Order.

   REPORT DUE DATE: No Later Than July 1, 1992

10. The discharger shall submit a technical report, within 6 months after completion of the slurry wall and groundwater extraction system, evaluating the effectiveness of the hydraulic containment system. Such an evaluation shall include, but need not be limited to, an estimation of the flow capture zones of the extraction wells/trenches, establishment of the cones of depression by field measurements, and presentation of chemical monitoring data.

11. All samples shall be analyzed by State certified laboratories using appropriate EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review.

12. Copies of all correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications and Provisions of this Order shall be provided to the following agencies:

    a. Regional Water Quality Control Board, San Francisco Bay Region, Land Disposal Division;

    b. Cal-EPA, Department of Toxic Substances Control (formerly Department of Health Services, Toxic Substances Control Division);

    c. California Integrated Waste Management Board; and,

    d. Contra Costa County Health Department.

13. The Discharger shall permit the Board or its authorized representative, in accordance to Section 13267 (c) of the California Water Code:

    a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any records are kept, which are relevant to this Order.

    b. Access to copy any records required to be kept under the terms and conditions of this Order.

    c. Inspection of any treatment equipment, monitoring equipment or methodology implemented in response to this Order.

    d. Sampling of any groundwater, soil, or waste which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

14. The Discharger shall file with the Regional Board a report of any material change in the character, location, or quantity of waste discharge. For the purpose of these requirements, this includes any proposed change in boundaries, contours or ownership.

    If due to activities conducted at landfill 15, any hazardous substance is discharged in or on any waters of the State, or discharged and deposited, or probably will be discharged in or on any waters of the State, the Discharger shall report such discharge to the following:

    a. This regional Board at (510) 464-1255 on weekdays during office hours from 8

a.m. to 5 p.m.; and,

b. The Office of Emergency Services at (800) 852-7550.

A written report shall be filed with the Regional Board within five working days and shall contain information relative to the following:

a. The nature of waste or pollutant;
b. The quantity involved and the duration of the incident;
c. The cause of spill;
d. The estimated size of the affected area;
e. The corrective measures that have been taken or planned, and a schedule of these measures; and,
f. The persons/agencies notified.

15. The Discharger shall maintain a copy of this Order at the site so as to be available at all times to site operating personnel.

16. The Board considers the property owner and site operator to have a continuing responsibility for correcting any problems within their reasonable control which arise in the future as a result of this Waste Discharge Order.

17. The Discharger shall notify the Board of any flooding, equipment failure, slope failure, or other change in site conditions which could significantly impair the integrity of waste or containment facilities or precipitation and drainage control structures.

18. These requirements do not authorize the commission of any act causing injury to the property of another or of the public, do not convey any property rights, do not remove liability under federal, state or local laws, and do not authorize discharge of waste without the appropriate federal, state or local permits, authorizations, or determinations.

19. The Board may review and update this Order periodically, as necessary, in order to comply with changing State or federal laws, regulations, policies, or guidelines; changes in the Board's Basin Plan; or changes in the discharge characteristics.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 15, 1992.

STEVEN R. RITCHIE
Executive Officer

Attachments
Attachment 1: Pollard Material Acceptance Criteria
Attachment 2: Vicinity Map
Attachment 3: Landfill 15 Proposed Unit
Attachment 4: Tier 3 Analytes for Soil Samples

Waste Discharge Order Project
Chevron U.S.A. Inc.
Richmond Refinery

Specification No. RS-933
Revision No.: 2
Date: 12/17/91

POLLARD LANDFILL PROJECT
Pollard Material Acceptance Criteria

A. CONTENTS OF POLLARD LANDFILL

In-Situ Characteristics:

1. Quantity: Approximately 60,000 cu. yds. (estimate is ± 20 percent)
2. Mix: Approximately 55% by Volume Acid Sludge Tar
   Approximately 45% by Volume acidic Dredged Bay Mud
3. Specific Gravity: Approximately 1.15 (Acid Sludge Tar)
   Approximately 1.40 (acidic Dredged Bay Mud)
4. pH: 0.5 to 6.7 — (Typically is found below 3.0)
5. Alkalinity Demand: Generally Below 15% by Weight Calcium Carbonate

B. FINAL PRODUCT SPECIFICATIONS

1. pH: 5.0 to less than 12.5
   Measured at 25°C

   Test Method: EPA 9045 for Calcareous Soils
2. Size: Acid Sludge Tar Particles Must Pass Through a U.S. Standard Testing Sieve (ASTM E-11) No. 4 Mesh

   Test Point: Measured "In-Process" at Screen Underflow or in unsolidified product
3. Minimum Shear Strength: 500 pounds/square foot for cohesive materials (or angle of internal friction of 30° for granular materials), with less than 1% creep distortion in 48 hours after initial loading.

   Test Point: Sample taken at Landfill 15 prior to final compaction.

   Test Conditions: After 5 Days of aging and as placed at Landfill 15.

   Test Method: ASTM D-4767. Sample shall be compacted to 90% of the maximum dry weight density as determined by ASTM D-1557. (If the CONTRACTOR's treatment process requires a higher degree of compaction to meet the minimum shear strength criteria, then the sample shall be compacted to that density. CONTRACTOR shall advise the COMPANY if this condition exists and the Landfill 15 compaction criteria shall be adjusted accordingly). Confining pressure during testing of cohesive materials shall be approximately equivalent to that exerted by two feet of the treated material. Granular materials shall be tested at confining pressures less than 1,000 psf. The standard test procedure shall be modified as follows: Sample shall be loaded to the specified shear strength and maintained at that level (plus or minus 10%) for a minimum of 48 hours. Measurements of deformation shall be made at regular time intervals (creep measurements shall begin after sample is loaded). At the completion of the 48 hour period, the sample shall be loaded to failure in accordance with the ASTM D-4767 procedure.

4. Leachability

   Test Method: Must pass the Toxicity Characteristic Leaching Procedure (TCLP) for metals (inorganics) and organics, in accord with EPA Method 1311 and species methods in SW-846, and shall pass California WET for inorganics.

   Note: The in-situ material does pass the TCLP.

5. Alkalinity Reserve: No less than one pound, expressed as calcium carbonate, per one-hundred pounds dry weight

   Test Method: Titration of finished product ground to pass a 40-mesh sieve, and moisture determination by EPA 160.3

6. Paint Filter Test: EPA SW-846, Method 9095

7. Bioassay

   Test Method: Must pass bioassay methodology per CCR Title 22, Sec. 66261.24, Para. (a), Sub. (6)., LC-50 > 500 mg/L for Fathead minnows

C. LANDFILL 15 COMPACTION CRITERIA

Greater than or equal to 90% of the maximum dry weight density by ASTM D-1557 and not to exceed the optimum moisture content. (If the CONTRACTOR's treatment process uses Portland cement then the allowable moisture content may be adjusted upwards to allow for sufficient water to fully hydrate the cement.)

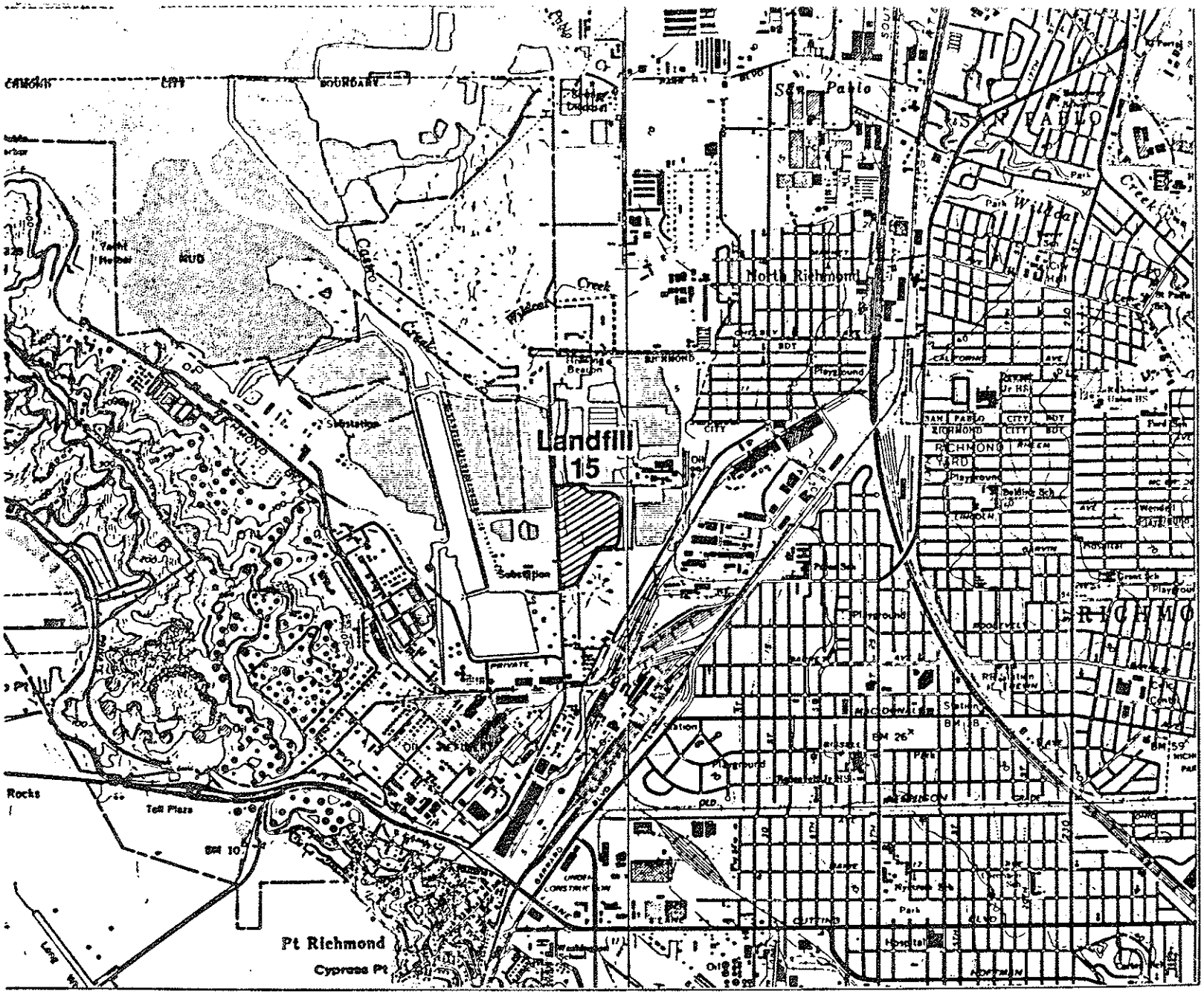
D. COMPLIANCE (ADDED)

Treated material must meet all federal and California hazardous waste criteria as non-hazardous, including but not limited to:

- TCLP - USEPA Method 1311, 40CFR Part 261, Appendix II, for metals, volatile organics, and semi-volatile organics,

and the following, as described in CCR Title 22, Section 66261.24:

- California Waste Extraction Test (WET) for inorganics, Table II of (a)(2) and related Appendix II, and
- Characteristic of Toxicity by acute aquatic bioassay, (a)(6).



EXPLANATION

Chevron USA Bounda

REFERENCE

USGS 7.5 Minute Topographic Series; San Quen
1959; Richmond, CA, 1959; Photorevised 1980.

Quadrangle Locations

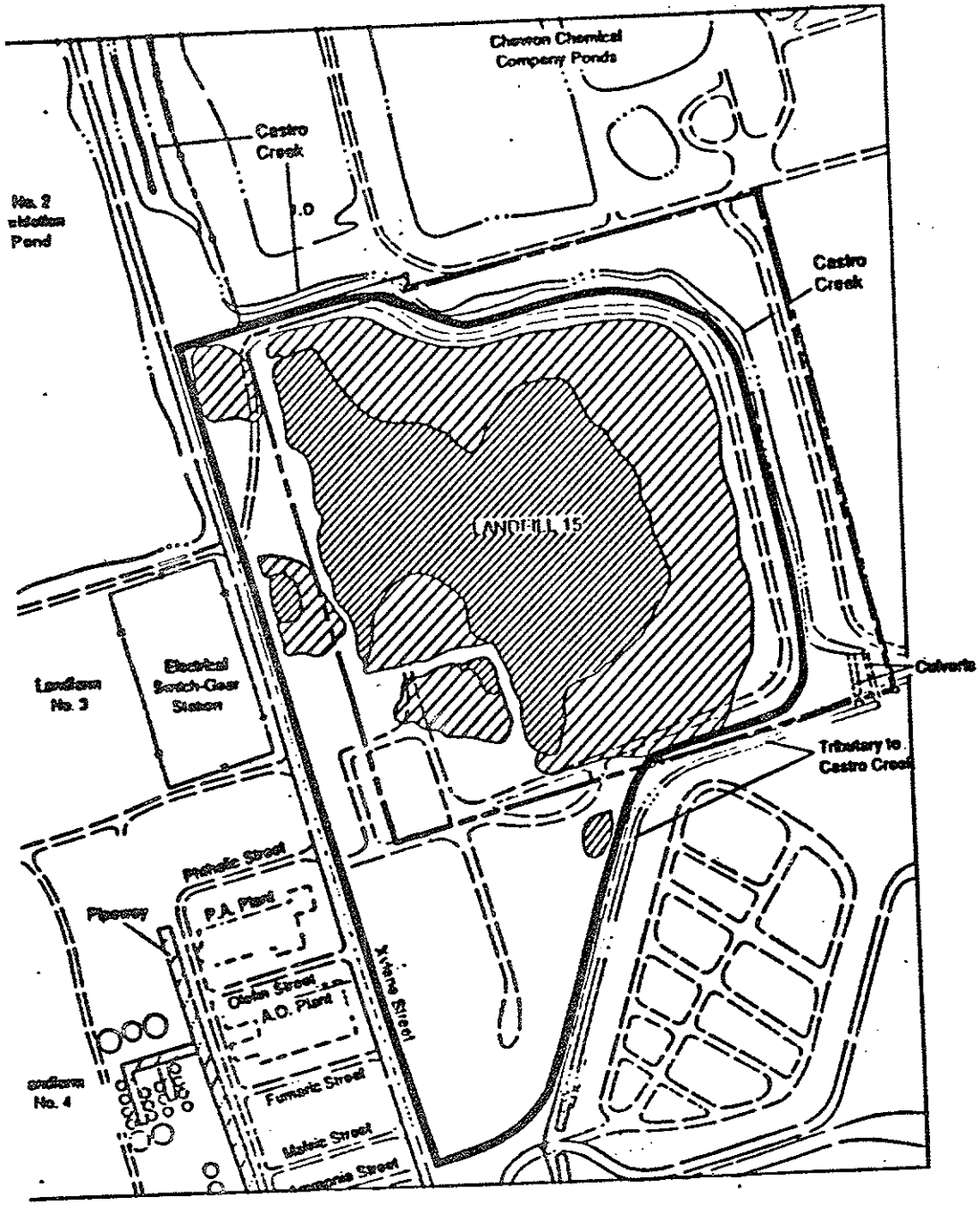
N

0 2000

Scale in Feet

VICINITY

Landfill 15 Corrective Action P
LANDFARMS/LANDFILLS S



KEY

- Areas Filled to an Elevation of 10 Feet, Refinery Datum from 1979 to 1982
- Areas Filled from 1982 to 1987
- Richmond Refinery Property Line
- Landfill 15 Boundary
- Prior Diked Area, Circa 1965
- Water Boundary
- Roadway

N

0 300
Feet

TABLE 3-2

TIER 3 ANALYTES
FOR SOIL SAMPLES

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium III
Cobalt
Copper
Iron
Lead
Manganese
Mercury
Molybdenum
Nickel
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Indicator Parameters

Chloride
Fluoride
Nitrate
Total Petroleum Hydrocarbons (TPH)

Volatiles

Benzene
Carbon disulfide
Chlorobenzene
Chloroform
1,2-Dichloroethane
Dichloromethane
(methylene chloride)
1,4-Dioxane
Ethyl benzene

Volatiles (cont.)

Ethylene dibromide
Methyl ethyl ketone
Styrene
Toluene
Total Xylenes

Semivolatile Acid-Extractable Compounds

Benzenethiol
Cresols (o, m, p)
2,4-Dimethylphenol
2,4-Dinitrophenol
4-Nitrophenol
Phenol

Semivolatile Base/Neutral Extractable Compounds

Anthracene
Benzo(a) anthracene
Benzo(b) fluoranthene
Benzo(k) fluoranthene
Benzo(a) pyrene
Bis (2-ethylhexyl) phthalate
Butyl benzyl phthalate
Chrysene
Dibenz(a,h) acridine
Dibenz(a,h) anthracene
1,2 Dichlorobenzene
1,3 Dichlorobenzene
1,4 Dichlorobenzene
Diethyl phthalate
7, 12-dimethylbenz(a) anthracene
Dimethyl phthalate
Di(n) butyl phthalate
Di(n) octyl phthalate
Fluoranthene
Indene
Methyl chrysene
1-Methyl naphthalene
Naphthalene
Phenanthrene
Pyrene
Pyridine
Quinoline

Chlorinated Solvents

Tetrachloroethylene
Trichloroethylene
1,1,1-Trichloroethane
Carbon Tetrachloride
1,1,2-trichloro-1,2,2-
trifluoroethane (Freon 113)
1,1,2-Trichloroethane

0209c